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THE  
ARLINGTON EXPERIMENT  
FARM



A Handbook of Information for Visitors

**THE ARLINGTON EXPERIMENT FARM**  
**of the**  
**UNITED STATES DEPARTMENT OF AGRICULTURE**

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**A Handbook of Information for Visitors**

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## THE ARLINGTON EXPERIMENT FARM

The Arlington Experiment Farm is the largest experiment station maintained by the Department of Agriculture in the vicinity of Washington. It is situated on the Virginia shore of the Potomac directly across from the National Capital. From almost any point on the farm, looking across the river, the beautiful Lincoln Memorial, the majestic Washington Monument, and the symmetrical dome of the Capitol can be easily distinguished in the stately sky line of the Capital City. Looking to the west, the massive pillars of the historic Arlington mansion, the beautiful memorial amphitheater, and the rolling wooded hills of the Arlington National Cemetery can be seen. The farm is of especial interest to visitors to the National Capital who are concerned with agriculture, and in increasing numbers each year they find their way across the Highway Bridge and along the military road to visit its interesting laboratories and inspect the many experiments being carried on in its greenhouses and fields. Visitors are always welcome, and the Superintendent, Mr. E. C. Butterfield, is glad to explain, or to arrange to have explained, the various phases of its work.\*

The farm is under the direction of the Bureau of Plant Industry, and most of the investigations form a part of the research work of that bureau, although facilities are also afforded for certain experiments by other bureaus. This farm is operated somewhat differently from most field stations, in that the farm office does not direct and conduct the experiments, but is charged with furnishing the necessary facilities, such as equipment,

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\* Acknowledgment is made to Mr. Butterfield for much of the information contained in this booklet, and also to the specialists in charge of the various lines of experimentation for data concerning their respective projects.

teams, and labor, for the offices that plan and carry out the experimental projects. No livestock experiments and no demonstration work are conducted here. The department maintains near Beltsville, Md., an animal husbandry farm and a dairy farm, and at Bethesda, Md., an experiment station for the study of animal diseases.

### Department and Bureau Functions

The Department of Agriculture is the administrative agency charged with the duty of fostering agriculture and certain related activities and industries in the United States. Its work covers every phase of agricultural interest and endeavor and is carried out through the activities of its several bureaus and agencies which have been organized to deal with the various kinds of agricultural problems.

The Bureau of Plant Industry\* studies the problems relating to plants and plant industries, including the improvement of plants by breeding and selection, the determination of causes of destructive plant diseases and methods of their control, the development of improved transportation methods for such perishable crops as fruits and vegetables, and the introduction of new crops from foreign countries.

### Forerunners of the Arlington Farm

This last function is a continuation of what was probably the initial effort of the American colonies in agricultural experimentation. For, following the example of Franklin, who served in England from 1764 to 1775 as agent of the colony of Pennsylvania, American naval and

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\* William A. Taylor, Chief of Bureau.

Karl F. Kellerman, Associate Chief of Bureau.

Henry E. Allanson, Assistant Chief of Bureau.

consular officers adopted the practice of sending home seeds and cuttings of foreign plants with the idea of introducing new varieties into this country. This work of introduction, propagation, and distribution of seeds and cuttings of foreign plants continued to be the major agricultural enterprise of the young American Government for many years.

Among the plants imported in 1854 and 1855 was the Chinese sugar cane or sorghum. In 1856 an area of about five acres at Sixth Street and Missouri Avenue N. W., in the City of Washington, was set apart for the propagation of sorghum. It is a matter of historical interest that the little office building erected on this tract of land was the birthplace of the National Grange in 1867.

The propagating garden thus started soon proved altogether inadequate for the ever-growing needs of the young Department of Agriculture, which had been created as an independent establishment in 1862. Therefore, in 1865 an experimental farm was established in the City of Washington on a tract of approximately 40 acres on the Mall between Twelfth and Fourteenth Streets and extending from B Street N. W. to B Street S. W. Gradually this tract was devoted to horticultural work including the arboretum that now forms part of the main department grounds.

Congress by an act of March 3, 1899,\* authorized the Secretary of War to grant permission to the Department of Agriculture to use temporarily as testing grounds a maximum area of 75 acres of newly reclaimed land in Potomac Park. This arrangement, however, like the two former ones, proved inadequate, and so by the act of April 18, 1900,\*\* Congress transferred to the Secretary of Agriculture about 400 acres of the Arlington estate in Virginia for use as "a general experimental farm in its

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\* 30 Stat. L., 1377, 1378.

\*\* 31 Stat. L., 135.

broadest sense, where all that pertains to agriculture in its several and different branches \* \* \* may be fostered and encouraged, and the practice and science of farming in the United States advanced, promoted, and practically illustrated."

### Some Arlington History

This farm, as well as the Arlington National Cemetery, is a portion of the historic Arlington estate, which originally formed a part of a grant of 6,000 acres made October 21, 1669, by Sir William Berkeley, then Governor of Virginia, to Robert Howsen as a reward for bringing settlers into the colony. The name "Arlington" was given to the property by Howsen. He seems to have valued the property lightly, however, as in the same year he conveyed the entire tract to General John Alexander for 6 hogsheads of tobacco.

More than a hundred years later (December 25, 1778) a portion of the tract (1,100 acres) was bought by John Parke Custis, son of Martha Washington, for 1,100 pounds in Virginia currency. Following his death the property went to his son George Washington Parke Custis, who was the adopted son of George Washington. The Custis family first occupied a small house on the hill immediately north of the present farm. The construction of the present mansion was begun in 1802.

At the death of her father the estate was inherited by Mary Ann Custis, who married Robert E. Lee. The Lee family occupied the mansion until April 22, 1861. In 1864 the estate was sold for taxes and bought by the Government for \$26,800, and by an Act of Congress of March 3, 1883, the heirs were paid an additional sum of \$150,000.

## Improvement of the Farm

The land was in poor condition for agriculture when the department acquired the farm in 1900. Not only had the cultivation of the land been neglected since 1861, but much of the top soil had been removed for lawn-making in the Arlington Cemetery. It was therefore necessary to devote much attention to the improvement of the soil in order to bring it into suitable condition for the purpose for which it was intended. This has been accomplished largely through the use of cover crops and stable manure. Although it has been a tedious, expensive process, it has afforded an interesting demonstration in soil improvement.

All the trees and shrubbery about the grounds have been planted since 1901. They give a good illustration of what may be accomplished by plantings of that character in such a limited period.

Other permanent improvements have been made from year to year. Tile drains have been laid under the experiment plots, a water system and a central heating plant installed, and permanent buildings erected, such as superintendent's residence, laboratories, greenhouses, barns, mechanical shops, and storage buildings. The two maps in this pamphlet show the general layout of the farm and the location of the buildings.

The more important phases of the work now being carried on are briefly set forth in the following pages.



## BUREAU OF PLANT INDUSTRY

### BULB CULTURE

Bulb investigations at the Arlington Experiment Farm have for their object the determination of the possibilities of bulb production in this general region. The problems studied have to do with storage as well as production, as so much depends upon suitable summer storage for several classes of bulbs that are being attempted here in a region having hotter summers than normal for them.

Of the bulbs that succeed here may be mentioned the hyacinth, daffodil, tulip, bulbous iris, and certain lilies, especially the Regal and Easter lilies.

One of the most striking facts developed in this work relates to the hardiness of the Easter lily, which has been generally looked upon as a tender plant. In 10 years' experience, however, no losses have been sustained from winter injury. The only precautions necessary seem to be a good covering of 4 or 5 inches of soil and late planting. This lily has proved to be very adaptable here. It grows well in the frostless Bermudas, where it goes dormant in early summer, but it is well-nigh an evergreen here.

The hyacinth seems to be very well adapted to local conditions, and as good bulbs have been grown here as are commonly imported. It is a very interesting fact that the artificial propagation of hyacinths can be done here with solar heat only, while generally the maintenance of steam or hot-water heat is necessary.

Daffodils of good quality are also produced. Some varieties do not succeed for the reason that they rot

during the storage season. However, most of the standard commercial sorts can be handled successfully.

This locality is rather hot for the best production of tulips, but Darwins do very well, increase satisfactorily, and keep well in a bank storage.

All of the bulbous stocks mentioned that have been produced at this station have one very valuable characteristic. They blossom early when forced, two weeks ahead of those grown on Puget Sound or those imported from abroad.

### CEREAL DISEASES

Greenhouse experiments in the study of diseases such as smuts, rusts, root rots, blights, and virus diseases, affecting cereals such as wheat, oats, and barley, are conducted at this station for the purpose of determining the nature of the diseases and developing means of control.

One of the more important experiments consists in testing the effectiveness of certain chemical disinfectants in controlling certain seed-borne diseases. Infected seed treated with these agents is sown in comparison with untreated seed and the results are observed.

Special studies are also being made in developing varieties and strains of the various cereals that may be resistant to or immune from the more serious diseases.

An important line of investigation in the greenhouses concerns the virus diseases. In these experiments cereal crops and plants of other sorts are grown, and the juices, which carry the viruses, are used for inoculation from diseased to healthy plants. By these means information is obtained as to the nature of the disease and also as to the nature of the virus that is the cause.

## CORN INVESTIGATIONS

The corn investigations at this station supplement those carried on throughout the United States in cooperation with certain of the State agricultural experiment stations. They comprise chiefly studies of the way that different characters in corn are inherited and investigations in improving corn by different methods of breeding. Besides the regular crop grown in the field, a second crop has been produced in the greenhouse during each of the last three winters. In this way many phases of the breeding experiments can be prosecuted twice as rapidly as if only the field were used. Studies also are being made to determine the best ways of using the greenhouse in connection with corn breeding.

All of the corn experiments utilize definitely controlled pollination. Various systems of inbreeding and crossbreeding are being compared to determine those under which the greatest advances can be made and those that are most practical. Major emphasis, of course, is placed upon increasing the productiveness of corn. Characters influencing the quality of the crop, and thus incidentally the yield, also are being studied. Special attention is being given to the ability of corn plants to stand erect, the effect of the chlorophyll content upon yield, the character of the husk as protection from insect attack, and the nature of smut resistance.

## DRUG PLANTS

A garden of medicinal plants is maintained at the Arlington Experiment Farm for the purpose of furnishing information on the proper methods of cultivation required by such plants, their habits of growth, and their general productiveness; also to furnish seed not usually available from commercial sources for distribution to those who wish to experiment with drug-plant culture. Plants yield-

ing volatile oils used for medicinal, flavoring, and perfume purposes are also under cultivation to permit studies on their requirements as farm crops.

### EFFECT OF LENGTH OF DAY ON PLANT GROWTH

In experiments to test the effect of length of day on plant growth the plants are placed in dark houses in the early morning and late afternoon to exclude sunlight for a part of each day during the long days of summer. The general principle has been worked out that in some plants flowering is induced by short days, such as prevail in fall and winter. These are called short-day plants. For example, Maryland Mammoth tobacco usually flowers too late in autumn to produce viable seed. By artificially providing shorter periods of daylight each day, flowering is easily induced at any time during the summer. In other plants, termed the long-day types, such as the beet, red clover, and the garden bee balm, long days favor flowering, and these plants can be forced in winter by use of the electric light for a part of the night to supplement daylight.

### FLORICULTURAL INVESTIGATIONS

On the grounds surrounding the Arlington Farm buildings there are planted a variety of ornamental plants arranged to produce a pleasing effect in the same manner as is possible on any farm. Most of the plants used are readily available from the average nursery at a moderate price, there being only a few unusual or expensive varieties. The approach avenue from the Arlington Cemetery is lined with willow oaks 27 years old, and clumps of shrubbery are utilized to hide the foundations of the various buildings.

The rose test garden is maintained in cooperation with the American Rose Society. It is at its best in May or June. The rose studies consist in a comparison of

varieties. The performance of the different kinds is compared with the behavior of the best kinds of the same type from previous tests. The behavior of climbers is compared with that of 20 kinds selected from 120 previously tested. The tea and hybrid tea roses are compared with 39 kinds selected from about 400 kinds tried in the gardens. And so with the other groups. The climbing roses are grown on their own roots. The tea and hybrid tea roses are grown on their own roots and are budded on manetti, multiflora japonica, and odorata roots, thus making four different kinds of roots for each variety.

A plot devoted to peony varieties that have been recognized as superior by the American Peony Society is maintained here. During the blooming season one can learn how the better varieties of peonies flower in the climate of this part of the country. In addition tests are now under way to determine the most satisfactory depth at which to plant peony roots under various soil conditions. Plants are also being propagated with which to carry on fertilizer tests for peonies.

Early flowering kinds of chrysanthemums suitable for use in regions north and west of Washington are being bred. Plants are grown from seed selected from the earliest flowering kinds. From 100 to 200 selections are made of the earliest flowering seedlings from each 10,000 plants, or 150 to 300 selections from an acre of seedlings. From these other selections are made, so that after 15 years there are now about 30 kinds that bloom September 7 and as many September 22 and October 5, respectively, which will soon be tested for hardiness farther north.

One greenhouse unit is being devoted to the breeding of carnations. So far the principal work has been breeding for a pure yellow. Up to the present time good deep yellows have been produced that have either a slight speck of white or a similar splash of red.

## FORAGE CROPS

Three lines of work with red clover are being conducted at this station. Samples of all lots of red-clover seed imported into the United States are planted in duplicate plots and compared with plots of the Tennessee anthracnose-resistant red clover. The results in 1928 showed that in no case were any of the imported lots equal to the American-grown seed for use in this vicinity. In trials with seed of American origin, duplicate small plots are sown to seed received from farmers in different parts of the United States, in order to determine how it compares with the Tennessee anthracnose-resistant seed for use in this section and to find any especially desirable strain that may exist in the United States and that should be increased and distributed. Trials on date of seeding are being carried on with a number of lots of imported and American-grown seed, one set seeded in the spring and another in August. The crops are harvested and weighed in June of the following year. The results of the last two years show that August seeding is more advantageous than spring seeding with imported seed, but that when good locally adapted American seed is used there is very little difference in the yield between August and spring seeding.

Trials are carried on each year with all the varieties and strains of sweet clover that can be obtained at home or abroad. Some varieties have already been found that appear to be decidedly superior in lengthening the period of grazing, in yield, and in other respects. As these more desirable varieties appear, the seed is increased so that a supply may be available with which to extend trials throughout the United States. An experiment is being conducted to determine the best time to seed sweet clover and also to determine the value of hulled, unhulled, and scarified seed.

In order to determine whether white-clover seed produced in different parts of the United States varies in value, and to test European strains, rod rows are sown to a large number of lots of white-clover seed, and observations are made as to their relative value. Preliminary results indicate that seed from Louisiana will produce plants that withstand the hot weather of this region in summer much better than those from seed grown in Idaho or Wisconsin.

Korean lespedeza has been propagated from a small importation made a few years ago and the seed increased and distributed through experiment stations in the South and in the Corn Belt. For the last two or three years 1,000 to 3,000 pounds of the seed have been produced annually at Arlington Farm. The variety has shown promise, especially in a belt just north and south of the Ohio River and more particularly in Missouri and Tennessee.

A variety of Japan clover has been propagated and distributed under the name of Kobe lespedeza. Yields of  $1\frac{1}{2}$  tons of hay to the acre have been obtained at this station, while the common Japan clover of the South scarcely grows large enough here to make grazing. This variety is being largely grown from the Ohio River south and has proved particularly good on the sandy lands of southern Mississippi.

A number of native lespedezas and beggar-weeds as well as Oriental species have been planted and maintained on acid soil at the station for several years, and one promising species is being tested to determine whether it will grow well on acid soils that are not adapted to alfalfa or red clover.

A large number of varieties and individual selections of soy beans and cowpeas are being tested. All the new varieties introduced from Manchuria are planted and

observed, and when any prove particularly valuable the seed is sown the next year in larger plots so that a more thorough trial can be made. Individual plants are also selected and the seed saved and planted.

The pigeon pea is a new crop to the United States. Most of the varieties are native to tropical countries, and only a few will mature their seeds in this climate, but by careful selection one or two varieties that will mature seed here have been obtained. Most of the work with this crop is done farther south.

A nursery is maintained in which are planted seeds of any new or unknown legumes, especially the clovers, to test their possible value in the United States.

#### FRUIT AND VEGETABLE UTILIZATION

After the grower has produced the fruits and vegetables there still remains the question as to the way in which they can be used most advantageously. Most fruits and vegetables are in best edible condition for only a limited time. If their use is to be extended, methods of preservation must be employed such as refrigeration, canning, drying, brining, pickling, and fruit-juice making.

The experiments at Arlington Farm in the utilization of fruits and vegetables are designed to study the problems of using the crops in the most advantageous way. Horticultural crops are being studied with the object of determining their suitability for food in the fresh state and also for the various methods of preservation. The fruit or vegetable is analyzed chemically, its physical characters are determined, and its behavior when preserved in the various ways mentioned above is noted. In this way studies of the development and ripening of sweet corn, peas, string beans, peaches, apples, pumpkin, summer squash, rhubarb, and eggplant have already been made.



The successful use of a fruit or vegetable in any method of preservation often depends upon the variety. The major part of the work of this laboratory is concerned with the study of varieties and their suitability for various uses. This is an endless task, because new strains and new varieties are constantly being originated. The more important varieties of apples, peaches, strawberries, tomatoes, sweet corn, pumpkin, and squash have been studied. It is the intention eventually to study the varieties of every horticultural plant species important as a source of food.

It has been found that certain vegetables contain considerable amounts of nitrates that were absorbed from the soil but were not converted into protein as is usually the case. These nitrates cause the tin can to corrode badly and in a few cases have practically prohibited the canning of the product in tin containers. Rhubarb is an example of this behavior, and other plants that contain considerable nitrates are pumpkins, beets, sweet potatoes, and eggplant fruits.

An important part of the work consists of studies upon methods of canning, drying, fruit-juice making, and jelly making, with the object of improving existing methods. The conditions necessary for drying fruits and vegetables, the penetration of heat into the can, the vacuum and pressure in the can under varying conditions, and the value of various methods of blanching have been studied. The corrosion of the tin can and the clarification of fruit juices are also being studied.

There is nearly always a certain portion of a crop which, because of size or defects, can not be advantageously marketed or used in the regular manner, and in some horticultural plants certain portions are not edible. There is always the possibility of developing methods by which this material can be converted into a by-product of value. These problems are studied in the laboratory from time to time.

Data are also being gathered with regard to the food value of different fruits and vegetables, which will eventually lead to better food products and thus help the consumer as well as the producer.

## FRUIT DISEASES

Pear blight and crown gall are subjects of special study in the fruit-disease investigations at Arlington Farm.

Pear blight, one of the most serious diseases of the pear, is caused by a bacterial organism. Since there is no effective control for it by means of the remedial measures used against most other plant diseases, it is believed that new varieties possessing desirable qualities and blight resistance may be produced by breeding. This process consists in applying pollen from the flower of one parent (male) to the stigma of the flower of another parent (female). The seed is saved from the fruit obtained by this process of cross-pollination and is planted, and the resulting seedling is subjected to both artificial and natural inoculations with the blight bacteria to test its resistance. If it shows suitable resistance it is kept until it bears fruit that can be tested for its merits. Some of the seedlings of merit grown as a result of crosses made in 1901 are now being grown in different sections of the country as preliminary trials. Approximately 5,000 seedlings are now being grown at this station.

Crown gall is a disease especially prevalent in the apple nursery. Experiments have demonstrated that it can be controlled by disinfecting the seedlings and cuttings from which the grafts are made in the process of growing the tree. Some of the newer organic mercury com-

pounds are used as disinfectants, since they have been found to be practically noninjurious to the plants. The organism causing crown gall is a bacterium that attacks many species of fruit trees and other plants. Since there has been difference of opinion as to the actual cause of certain types of galls found on grafted apple trees, experiments both in the field and in the greenhouse are being conducted in an attempt to settle this question.

## FRUIT PRODUCTION INVESTIGATIONS

The experiments in fruit production include a variety apple orchard which at the present time contains some 200 or more varieties and which is being gradually eliminated as the objectives are accomplished. The objectives are: (1) A study of the adaptability and merits of the different varieties; (2) to furnish material for use in making varietal descriptions and illustrations; (3) to furnish raw material for utilization investigations from the variety standpoint; (4) to furnish material for use in apple handling and storage work. This orchard originally contained about 500 or 600 varieties, but it has already been reduced to its present extent because the objectives were accomplished. This activity also includes the breeding of apples.

A small collection of cherry varieties of the Marasca type has been planted for the study of varieties and their adaptability and to furnish propagating material.

A small collection of trees of the named native varieties of persimmons is maintained.

## GRAPE INVESTIGATIONS

A vineyard comprising about 300 varieties of grapes is maintained primarily for the study of varieties, their adaptability, characteristics, and merits. The varieties represent about 250 of the native American bunch grapes and about 50 vinifera or European sorts. The vineyard furnishes material for varietal descriptions and illustrations and raw material for utilization investigations, particularly a study of grape juices and the merits of the juice of different varieties in the preparation of unfermented juice for beverage purposes. In addition to these objectives, the vinifera varieties in the collection are used in a study of the possibilities of growing this type of grape under eastern conditions.

## HEMP CULTURE

Hemp has been grown at the Arlington Experiment Farm each year since 1914, chiefly for the purpose of developing better strains. Numerous introductions from foreign countries are also tried, but a very small proportion of them have given promise of value. The hemp seeds are sown early in April, the plots of different strains being placed 40 rods or more apart to avoid cross-pollination. At maturity the plants range in height from 9 to 16 feet, occasionally reaching 18 feet, and are the tallest annual plants grown at Arlington Farm. Notes and measurements of every pistillate plant are taken in September, and selected plants are tagged for identification.

The seed from each selected plant is kept separate, and that from the best plants is used for planting the next crop. The bulk seed from unselected plants is distributed in small quantities to hemp seed growers, so that a large proportion of the hemp seed now produced in Kentucky consists of the progeny of seed of pedigreed varieties developed at this station.

## LAWN GRASSES

Experiments are being conducted to determine the best methods for establishing and maintaining a good lawn in the vicinity of Washington. Some plots are seeded to Kentucky bluegrass, some to other species of grass, and others to various mixtures. Some are limed, some unlimed, and some are fertilized in various ways and at different times.

## MUSHROOM INVESTIGATIONS

In the summer of 1928 work was begun in cooperation with the Bureau of Entomology on a project designed to study the culture, diseases, and insects of mushrooms.

The chief limitations of the mushroom industry are the growing scarcity of horse manure, which at the present time is the only known medium suitable for making the beds, and the increase of fungous diseases and insect pests. Looking toward the solution of the first, attempts are being made to produce artificial manure suitable for mushroom culture by composting straw with various nitrogenous compounds. In the experiments to discover new methods of combating diseases and pests there are approximately 1,500 square feet of beds.

## NURSERY INVESTIGATIONS

The nursery experiments at this station deal with the propagation of fruit trees and some woody ornamental plants, especially roses.

Fruit trees, as most people know, do not usually come true from seed, and most of the common orchard trees can not be increased readily from cuttings; hence the fruit tree is ordinarily an assembled article, a combina-

tion of two plants produced by budding or grafting a bud or a twig of the desired variety on another plant, often a seedling. The plant so used to form the root system is termed the "stock." Roses and some other important ornamental plants that can be increased from outtings are often increased also by budding and grafting.

In these nursery experiments better stocks for apple, cherry, pear, peach, and rose than those now in common use are being sought. Tests of many types of seedlings for this purpose are under way, besides several forms that may have exceptional value as stocks from cuttings and layers. Practical cultural methods in the propagation of these stocks are also receiving attention.

The propagation of roses by budding on several types of stocks is also a part of this work. The rose garden south of the greenhouses is a test of 14 different stocks each budded to several well-known hybrid tea roses in comparison with the same varieties from cuttings, usually called "own root" plants.

In one of the greenhouses and the frames adjoining are several experiments in propagating rhododendrons and several horticultural forms of coniferous evergreens by cuttings and by grafting.

## NUT CULTURE

The investigations in nut culture at Arlington Farm consist chiefly of varietal studies of the principal genera and species hardy in this climate. The plantings and studies comprise black walnut, butternut, Japanese walnut, various hickories (including pecan), filbert, chestnut, and various hybrid forms. Some nursery work is being carried on, mainly for the purpose of providing stocks upon which to propagate new seedlings.

## PAPER MULCH EXPERIMENTS

The agricultural use of an impervious-paper mulch first attained economic importance on the pineapple plantations of Hawaii about 1922. Since then the experimental use of paper mulch has extended to widely separated regions of the world, with the result that the mulch has proved to be effective for plant stimulation and weed control with a variety of crops grown under differing conditions of soil and climate.

During five successive seasons the influence of the paper mulch upon various crop plants at the Arlington Experiment Farm has been definite and appreciable. By placing the seeds or plants between the rows of paper held with long wire staples the paper was kept more nearly intact for repeated use with other crops in the same season and in other seasons. The block system devised and used in these trials eliminates all weeding and cultivation between the rows.

With crops such as lettuce, okra, cucumbers, and melons, germination was hastened to such an extent that it was not unusual to have a substantial showing of plants on the mulched area before any of the unmulched plants were visible. The mulched plants made more rapid growth and maintained an appreciable advance over the unmulched plants until maturity. With crops such as beets, carrots, and Swiss chard, grown on fertile soil, the final heights of the mulched and unmulched plants were not significantly different, but the mulched plants showed earlier maturity and increased yield. When these same crops were grown on relatively poor soil the unmulched plants never attained the vegetative development shown by the mulched plants. With crops such as green beans, okra, and sweet corn the unmulched plants never reached the height of the mulched plants, even on fertile soil. The influence of the mulch on the hastening of maturity was especially marked with

potatoes and sweet corn. In general the paper hastened the maturity by from 7 to 14 days.

Present trials include tests of the durability of different papers and tests with nursery stock and with various other aspects of mulch usage.

## POTATO INVESTIGATIONS

The potato investigations at this station include studies of both cultural and storage problems.

The cultural work in 1928 consists of experiments to determine the most favorable time for planting the Jersey Red Skin potato for fall crop production and the development of a disease-free strain of that variety by the tuber-index method. Tuber indexing of seedlings and varieties in the greenhouse is practiced in order to maintain high-grade seed stocks in field culture. A study is also being made of the effect of different fertilizers, well and poorly mixed with the soil, on corked-over and freshly-cut seed.

The cold-storage studies are designed to determine the length of time that potatoes may be successfully stored at 32°, 36°, and 40° F., together with shrinkage resulting from moisture loss, decay, and germination; the rest period and dormancy of potatoes at temperatures ranging from 32° to 70° F.; effect of low and high temperatures (32° to 70° F.) on the viability and yield of seed potatoes when placed in storage shortly after harvesting, also the effect of such temperature on the table quality of potatoes; the influence of humidity and temperature on the suberization and keeping quality of cut seed during the storage period; and the influence of freezing on seed potatoes as regards their viability and productivity.



## SMALL GRAINS

Agronomic and breeding experiments and genetic studies with wheat, oats, barley, rye, spelt, and emmer are conducted at the Arlington Experiment Farm. Varietal experiments are conducted in which established or new varieties are compared in plots usually one-fortieth of an acre in size but sometimes larger or smaller. Selections developed by breeding are included in these tests when they show sufficient promise.

Breeding experiments are carried on for the improvement of yield and quality of grain. Disease resistance is an important factor in these operations. Selections from varieties and from hybrids, and introductions from foreign countries, are tested to determine their reaction to rust, smut, scab, and other diseases. Selections of oats and barley are also tested for resistance to cold. In breeding experiments the selections are usually grown in 5-foot and 16-foot or 18-foot rows, which are harvested by hand.

Genetic studies are made to determine inheritance of various factors. These comprise crosses between different varieties, species, and genera, including the wild relatives of the different crops. Much of this work is done in the greenhouse. Cultural and physiological experiments include such studies as the reaction of varieties when seeded at different dates, effect of seed treatment on yields, effect on yield of rate and date of seeding and preparation of land, and reaction of varieties to variation in duration of lighted period.

## SUGAR CANE AND SUGAR BEETS

The investigations with sugar plants consist largely of the propagation of sugar cane from cuttings of new varieties obtained from foreign countries. The cuttings are planted in greenhouses under rigid quarantine conditions, where the resulting plants are subjected to careful study for a period of one year as a precaution against the introduction of new diseases and pests. Cuttings of varieties that are found to be satisfactory are prepared and shipped to sugar-cane field stations in Louisiana, Florida, and Georgia, where the varieties are studied further and used for breeding hybrid varieties.

Other experimental work, all of which is carried on under quarantine greenhouse conditions, consists of the study of the transmission of the curly-top disease of sugar beets by insect carriers and the study of sugar-cane root-rot organisms.

## TOBACCO EXPERIMENTS

Domestic varieties of tobacco are grown for comparison of growth habits and disease resistance with varieties of foreign introduction. One particularly promising variety has been found, the seed of which came from South America. Breeding work is being done in an attempt to develop strains resistant to black root rot for Maryland and a resistant stand-up White Burley Mammoth that can be used in the Kentucky Burley area. A study is being made of the effects of liming at different rates on the growth of different tobacco varieties and other plants. Acids have been added to the soil to determine whether higher acidity produces better growth. The virtue of greensand as a source of potash for tobacco is being tested.

## TOMATO WILT INVESTIGATIONS

The use of resistant varieties is the ideal method of controlling plant diseases. Where diseases are destructive, resistant varieties increase the certainty of producing a crop, give a larger yield and a better quality of fruit, and require no labor or expense for spraying, dusting, or other treatments for the control of disease. The only additional cost is for picking and handling the increased yield, and this is easily offset by the higher price obtained from the improved quality of fruit.

The following tomato varieties developed at Arlington Farm are highly resistant to Fusarium wilt and nailhead rust and somewhat resistant to several blights: Marvel, Marvana, Marvelosa, Columbia, Norduke, Norton, and Marglobe. Several new varieties are in course of development.

The varieties already developed not only resist the diseases mentioned but produce heavy yields of excellent fruit. They are all used commercially, some of them extensively. The Marglobe is used on a larger scale than any other in nearly all the principal trucking regions and in many canning regions of the United States. It has saved the fresh-tomato industry in Florida, where 25 to 40 per cent of the \$10,000,000 crop was formerly destroyed by nailhead rust. It is also used by many of the largest and best manufacturers of tomato products. One company used a ton of Marglobe seed in its territory in the spring of 1928.

## TRANSPORTATION AND STORAGE OF FRUITS AND VEGETABLES

The cold-storage plant at the Arlington Experiment Farm contains 16 storage rooms which are maintained at different temperatures and humidities for experimental work on a wide range of perishable commodities. There are also laboratories for chemical, physiological, and electrical work, a mechanical shop, and a large general workroom.

Refrigeration for the cold-storage rooms is furnished by a modern ammonia compression plant, the cooling being effected by the indirect system with cold brine pumped from the brine tank in the engine room to the various rooms.

Investigations are conducted on the proper conditions of temperature and humidity for the storage of fruits, vegetables, and nuts, on the changes that occur in these commodities when held under different conditions, on the effect of low temperatures on the ripening and coloring of tomatoes, bananas, and certain other produce, and on the effect of various gases on fruits and vegetables. Studies are also made of the problems connected with the construction of refrigerator cars and the small shipping cases known as pony refrigerators. New apparatus for the control of temperature and humidity is designed and constructed, and the apparatus necessary for the study of the temperature of fruits and vegetables in transit is kept in order.

### TURF PLOTS

In cooperation with the United States Golf Association, a series of plots of the grasses best suited for the making of putting greens is maintained. Stock material of the main varieties of bent grass is maintained for sending out as necessary. Different strains and

species are grown side by side for comparison as to their relative value. Experiments to study the use of fertilizers are also conducted.

In another series of experiments the diseases that attack fine turf grasses are being studied with a view to developing remedies.

## VEGETABLE PRODUCTION

The vegetable production investigations at this station include studies of sweet potatoes, pumpkins, squashes, cauliflowers, and tomatoes.

The Arlington Experiment Farm is the base for extensive work which has as its purpose the development of high-producing, disease-free strains of the better commercial varieties of sweet potatoes. Seed stock is stored and plants produced at the farm, but the major part of the field work is carried on in near-by locations where soil of suitable character can be obtained. A variety collection including practically all of the established sorts is maintained, from which material is supplied to other institutions and individuals conducting research work on sweet potatoes. The relative resistance of the different varieties to stem rot and other diseases is being studied and comparative yields obtained. In cooperation with the Virgin Islands Experiment Station, breeding work is being conducted with the purpose of obtaining hybrids with desirable dominant characters.

Several hundred sweet potato seedlings obtained from various sources have been and are being tested, and some of these have high edible quality and may become of importance.

Storage studies are under way to determine the effect of different curing temperatures and humidity on shrinkage and decay of standard varieties of sweet potatoes.

Storage studies of about 15 of the leading varieties of pumpkins and squashes are in progress. These involve investigations on curing the fruits at both low and high temperatures. Preliminary results indicate that high-temperature curing is feasible for certain varieties but not for others.

The production of greenhouse-grown cauliflower seed has been shown to be entirely practicable. The period from November 1 to December 1 has proved to be the best time for setting the plants in the greenhouse for seed production. Earlier or later dates result in greatly decreased yields. The Arlington strain is giving very satisfactory results both in the greenhouse and in the field, and attention is now being directed to greenhouse seed production of some of the better commercial varieties.

A combined study of the Marglobe tomato as a greenhouse sort and the effect of phosphorus on earliness and yield is in progress. Very gratifying results have been obtained from the trial of this tomato as a greenhouse variety.

Experiments involving the use of mixtures of peat and soil with and without fertilizer, compared with greenhouse compost with and without fertilizer, for roses and carnations, are in progress.

## VEGETABLE STANDARDIZATION

Standardization investigations, including improvement and studies in trueness to type, are being carried on with a number of vegetables.

A varietal trial and some cultural and multiplication plots of Jerusalem artichokes are grown. This includes over 100 types. They are being studied to find methods of culture and to find varieties best adapted for the production of inulin, from which levulose (a sugar) may be manufactured.

A variety trial of over 1,000 numbers of peas were grown in 1928 for descriptive work. About  $2\frac{1}{4}$  acres of sweet corn was grown for the purpose of breeding better strains of canning corn. This included many crosses and many strains of selfed corn. About three-quarters of an acre of tomatoes for canning tests and for breeding work were also grown.

## BUREAU OF ENTOMOLOGY

### TRUCK CROP INSECTS

Two plots of one acre each are maintained for the study of truck-crop insects. One of these is devoted to an experimental planting of bramble fruits, used for studies of the insect population of these plants, particular emphasis being laid upon those insects that transmit the serious mosaic diseases so destructive to commercial plantings. The leading commercial varieties of red, black, and purple cane raspberries and blackberries are here represented, both as diseased and clean stock, and a representative collection of pests is present.

The other plot is used for growing various garden vegetables for insecticide tests. On this plot, field experiments to test the comparative effectiveness of arsenicals against insect pests in combination with determinations of spray residues possibly injurious to the consumer are undertaken.



## FOOD, DRUG, AND INSECTICIDE ADMINISTRATION

### CERTIFIED FOOD COLORS

From the beginning of things, brilliant coloring has been one of the devices of nature to call attention to the ripest berries and the sweetest fruit. The loss of this same bright coloring is also nature's warning, so that the overripe strawberry or the decayed tomato show by their unattractive appearance that all is not well within. These facts have led the food merchant to use foreign coloring materials in his merchandise to simulate superiority or to conceal inferiority. Of these materials the coal-tar dyes, because of the range of possible colors, eventually became the leading ones. The dyes were used indiscriminately without regard to nature or origin, the only limiting factors being shade and cost. Cases of poisoning traced to artificial coloring matters were not uncommon, and this condition led to Government intervention. From this arose the idea of certified food colors, and now samples of all food colors sold as certified must run the gauntlet of a rigid series of tests in the Color and Farm Waste Laboratory here at Arlington Farm.

Started in a very minor way in 1907, the certification of food colors has grown to a point where more than 600,000 pounds of dyes were certified for use during the fiscal year ended June 30, 1928. This includes primary dyes from the permitted list, repacks of these primary dyes, and mixtures of primary dyes made to obtain shades not otherwise available. The certification regulations are so strict that the certificate applies only to the original package in which the dye was sold and ends with

the breaking of the seal on that package. Inasmuch as there are many dealers in certified colors who do not actually manufacture these products, but who do sell them in small containers or in mixtures, they are required to submit samples of these repacks or mixtures before they are allowed to put them on the market as certified colors.

New colors have been added to the list of seven first certified, until there are now twelve, and more are constantly being proposed. These last will be added only after they have passed the very strict tests made at this laboratory and if a real need for them can be shown.

## BUREAU OF CHEMISTRY AND SOILS

### COLORS AND FARM WASTE PRODUCTS

Other interesting lines of work are carried on at the Color and Farm Waste Laboratory besides its function of the certification of food colors. These include the production of intermediates for fast dyes and the study and synthesis of the colored stains that are used in the microscopic study of disease.

Every housekeeper is annoyed time and again by mold forming on her vegetables and preserves. Doubtless she would deny vigorously that the same mold that causes her so much distress could have a use in the general scheme of things. And yet experiments conducted in this laboratory with molds of various kinds are showing conclusively that useful things can be evolved from the chemical action of these fungi.

Experiments are also conducted looking to the utilization of farm waste products such as corn cobs, peanut shells, etc. At present these experiments are confined to the making of a cellulose suitable for rayon from peanut shells.

### DUST EXPLOSION PREVENTION

Practically all combustible materials, when finely divided and mixed with air in the proper proportion, will explode violently if the mixture is ignited by a spark or a flame. Many explosions of grain dust have occurred both during threshing operations and in country or terminal grain elevators. Explosions of fertilizer dust, powdered

milk, insecticides, leather dust, wood dust, sugar, starch, and many other products have occurred. Over 500 lives have been lost, more than 900 persons have been injured, and the property loss has amounted to approximately \$40,000,000 in the explosions that have been reported. The dust-explosion hazard exists in at least 28,000 industrial plants, employing over 1,324,000 persons and manufacturing annually products valued at more than \$10,000,000,000.

In the Dust Explosion Prevention Laboratory experimental work is carried on to determine the factors affecting the explosibility of various dusts, the ignition temperature, and the rate of flame propagation. Many samples of dust are sent to this laboratory to be tested in order to determine their explosibility. The laboratory is equipped with apparatus in which miniature dust explosions can be produced for demonstration purposes. Demonstrations can be arranged for anyone calling at the laboratory.

The work under way at present in the experimental mill was planned to determine the best method of using inert gas for the prevention of dust explosions in feed-grinding equipment. Earlier laboratory tests had shown that it is possible to prevent dust explosions by reducing the percentage of oxygen in the air in which the dust is suspended by adding to the dust and air mixture an inert gas such as carbon dioxide or nitrogen. The present equipment in the mill is set up to demonstrate the ease with which flue gas from a near-by boiler house can be used as a source of carbon dioxide. Provision has been made through the installation of an electric arc in the dust chamber directly below the grinder to demonstrate the impossibility of igniting the dust when the percentage of oxygen within the inclosure has been sufficiently reduced.

Arrangements can be made for demonstrations of the value of inert gas as a preventive of dust explosions by calling at the offices of the Chemical Engineering Division of the Bureau of Chemistry and Soils.

### FARM FIRE PREVENTION

Fires on farms and in rural communities annually take a toll of 3,500 lives and destroy \$150,000,000 worth of property, according to conservative estimates. The principal causes of rural fires are spontaneous ignition of agricultural products, defective chimneys and flues, combustible roofs, matches, smoking, careless handling and storage of gasoline and kerosene, and faulty electric wiring and improper use of appliances.

Investigations of the causes of farm fires and for devising new and improving existing equipment and methods for prevention and control are being carried on in the Farm Fire Prevention Laboratory. Cooperative work is also being undertaken with nationally known organizations such as the National Fire Protection Association, the National Fire Waste Council (Chamber of Commerce of the United States), the Farm Bureau Federation, and the National Grange. The Committee on Farm Fire Protection of the National Fire Protection Association, of which the chairman, the secretary, and two other members are representatives of the Department of Agriculture, is actively engaged in efforts to reduce the serious loss from rural fires.

### FERTILIZER INVESTIGATIONS

In the Fertilizer Laboratory at Arlington Farm studies are made of the preparations and properties of new fertilizer materials with a view to improving the mechanical properties of fertilizer mixtures and reducing their cost to the consumer.

The plant food constituents in a mixed fertilizer of average grade amount to a total of only 16 per cent. The inert material which goes to make up the balance of the mixture adds greatly to its ultimate cost by increasing storage, handling, and transportation charges. The work of the Fertilizer Laboratory has shown that mixtures may be prepared which weigh only one-half to one-fifth as much as the ordinary fertilizer per unit of plant food. The importance of this work is readily seen when it is realized that the freight bill alone for fertilizers in this country amounts to about \$20,000,000 annually.

The term "concentrated fertilizers" as applied to mixtures of this kind was first used in the Bureau of Soils, where work on the subject was begun about 12 years ago. Until the last two or three years there was considerable doubt as to the practical application of fertilizer mixtures of this kind, and none were found on the market. The investigations in this field show that concentrated fertilizers can be made which are capable of being distributed by present farm machinery and which are equal if not superior in mechanical properties to the average low-grade fertilizer. It has also been demonstrated that by proper selection of the components in the mixture the danger from burning in the use of concentrated fertilizers may be no greater, and may even be less, than with certain of the ordinary low-grade mixtures.

The information gained on the subject is now being put to commercial application, and during the last year concentrated fertilizers have been placed on the market which contain as high as 60 per cent of plant food. These fertilizers are sold to the consumer at a lower cost per unit and with greater profit to the manufacturer than the corresponding lower grade mixtures.

The conservation of the phosphate rock deposits of this country through the economical utilization of low-grade and waste materials is a further important phase of the fertilizer investigations. Improved methods of producing phosphoric acid, necessary in the manufacture of concentrated fertilizers, originated in this laboratory and have been adopted by the industry not only in this country but also in Europe. Other phases of the work include investigations in the production of valuable by-products from phosphate rock and improved methods for the production of phosphatic fertilizers.

The problems of the big user of fertilizer are not the only ones studied, however; those of the home owner and the housekeeper with her plants also receive attention. Information gained in this work has been used by the industry in putting up fertilizer in small packages for lawns or the small garden of town or city and in tablet form for the housewife to feed her plants.

### SOIL FERTILITY INVESTIGATIONS

Field studies are made to determine the effect of concentrated fertilizer mixtures on germination, growth, and yield of corn, potatoes, sweet potatoes, wheat, and certain garden crops, such as string beans, Lima beans, tomatoes, and sugar corn. In field and greenhouse experiments with potatoes different methods of applying concentrated fertilizers, as influencing germination, growth, and yield, are compared.

Corn, wheat, and cowpeas are grown in rotation, and wheat is grown continuously to determine the most suitable ratio of nitrogen, phosphorus, and potassium. Greenhouse and laboratory work is carried on involving pot, bench, and solution culture studies of the effect of air-derived nitrogen salts and certain soil constitu-

ents, such as manganese, aluminum, sulphur, etc., on the physiological activity of different indicator plants.

Fertilizer mixing investigations include the preparation of all the fertilizer mixtures used in the field. Assistance is rendered to other bureaus as requested in connection with their fertilizer mixing problems.

Cooperative field and greenhouse experiments with the Bureau of Plant Industry are conducted to determine the effect of different fertilizer combinations, ordinary and concentrated, on freshly-cut and corked-over potato seed pieces.

### SOIL MICROBIOLOGY

The field plots allotted to the experiments in soil microbiology are the principal sources of soil samples for laboratory work on the general soil flora and on special organisms. Two rotations have been continued for 14 years on certain plots, one an 8-year ordinary rotation with 2 years of grass, the other a continuous cultivation 4-year rotation. On certain plots cover crops, both legume and nonlegume, are grown and turned under as green manures; on other plots ammonium sulphate, sodium nitrate, and rotted manure are added separately or in combination. This field provides excellent material for studying the soil microorganisms and their effect on soil fertility. Another field is given over to the growing of legumes for testing the effect of continued inoculation and whether a strictly legume rotation benefits the soil as measured by crop production and soil flora. Still another field is used for testing the effect of various green manures upon the soil flora and upon the soil nitrogen. On some plots crops are raised and harvested, while on others no crop is harvested, all being plowed under as green manure.



In the greenhouses commercial inoculating materials for legumes are tested by placing them in bottles with sterile sand in which a sterile legume is growing. The production of nodules on the legumes shows that the material is useful, whereas no nodules would indicate that it is useless and its sale to the farmer should not be allowed. Another greenhouse is filled with three different type soils which are treated variously with lime and green manures, to serve as sources of material for laboratory study of the soil microorganisms for comparison with similar studies made on the field plots.

## BUREAU OF PUBLIC ROADS

### ROAD EXPERIMENTS

An outdoor laboratory is maintained at Arlington Farm for the study of road-building problems. The work consists largely of field experiments, test roads, and tests of model bridges, all of which are designed to develop information leading to more economical road designs or to the more economical use of road materials. Among the more important experiments are those to determine the effect of the impact of motor trucks on various kinds of pavement. Special machines and intricate instruments have been developed for making precise measurements of this force. There is a circular test track some 200 feet in diameter on which have been carried out accelerated traffic tests on many kinds of paving materials. The most recent test on this track was one in which brick surfaces of different thicknesses were subjected to heavy concentrations of actual traffic, and the information was developed that economies were possible in the construction of this type of pavement through reduction in the thickness of brick necessary for the wearing surface.

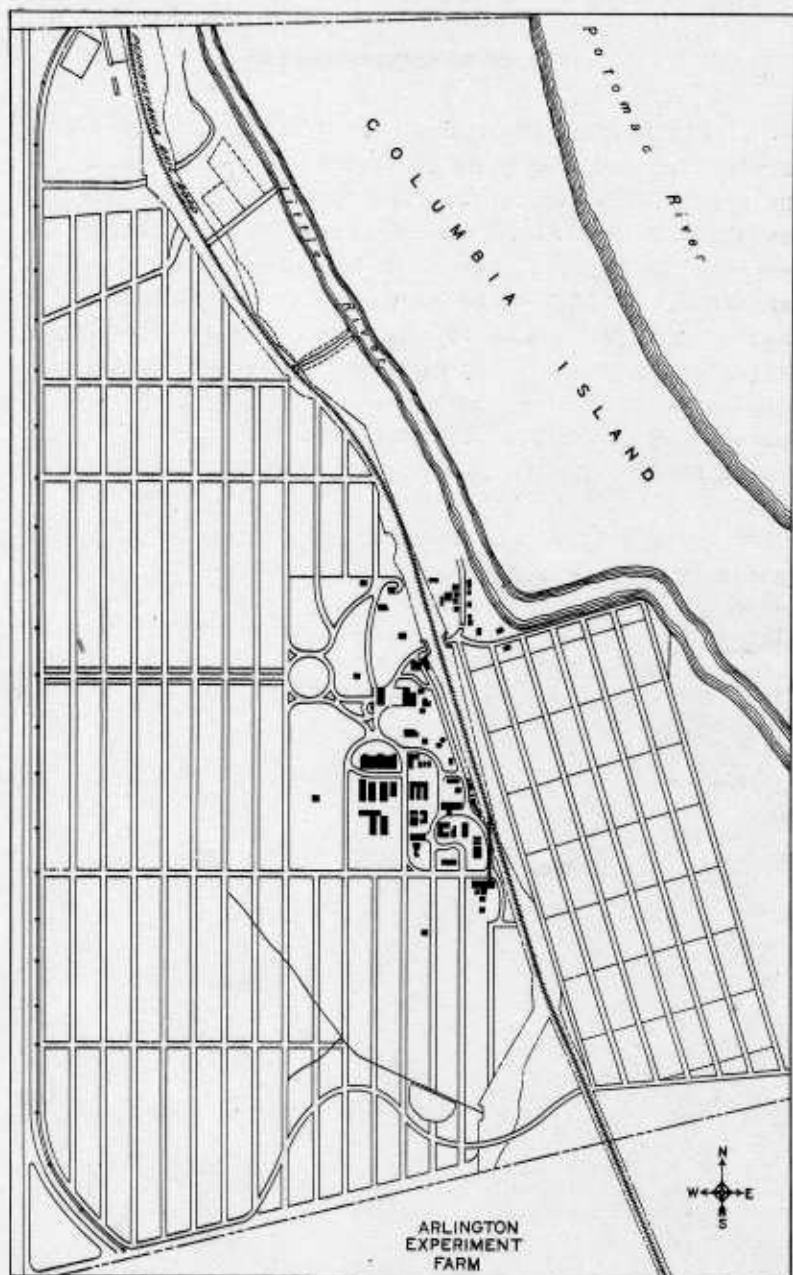
Extensive tests using the various proposed methods for curing concrete pavements may also be inspected. More than forty concrete strips have been cured by the different processes and have been exposed to the weather for about two years. In addition to the bituminous laboratory previously mentioned, there are maintained a subgrade soil laboratory and a concrete laboratory. Experiments are also being conducted with reference to highway bridge design.

## PUBLIC HEALTH SERVICE, TREASURY DEPARTMENT

### PROPER NATURAL LIGHTING

For several years the United States Public Health Service has been carrying on investigations relating to the proper natural lighting of factories, hospitals, and schools with a view to the avoidance of eye strain. To complete the study it was found necessary to erect an illumination cabinet where the ratio between outside and inside daylight could be carefully investigated. The Arlington Experiment Farm was selected as the location for this cabinet because the ground is fairly flat and because it was possible to obtain a site free from interfering shadows cast by buildings or trees.

This work at the farm includes studies of the relation of window size, form, and location to depth and width of room, height of ceiling, and color and character of interior finish.



- 1 BARN AND OFFICE BUILDING
- 2 SUPERINTENDENT'S RESIDENCE
- 3 STABLE FOREMAN'S RESIDENCE
- 4 SHOP BUILDING
- 5 FARM GREENHOUSES; SPACE ASSIGNED TO CEREAL AGRONOMY, HORTICULTURAL EXPERIMENTS, DRUG PLANTS, VEGETABLE AND FORAGE DISEASES, MICROBIOLOGICAL INVESTIGATIONS, AND FRUIT DISEASE INVESTIGATIONS
- 6 PUMP HOUSE
- 7 WATER TOWER
- 8 CORN CRIB
- 9 DRUG LABORATORY, TOBACCO INVESTIGATIONS; STABLES AND GENERAL STORAGE
- 10 INSECTICIDE STORAGE
- 11 IMPLEMENTS AND FERTILIZER STORAGE BUILDING
- 12 STORAGE BUILDING
- 13 TOBACCO DRYING HOUSE
- 14 OFFICE AND SHOP BUILDING
- 15 OIL STORAGE
- 16 THRESHING SHED FOR FORAGE AND CEREAL CROPS
- 17 SUPERINTENDENT'S GARAGE
- 18 COLOR AND FARM WASTE DIVISION LABORATORY
- 19 FERTILIZER RESEARCH LABORATORY
- 20 SOIL FERTILITY LABORATORY AND GREENHOUSE
- 21 REFRIGERATION BUILDING
- 22 SWEET POTATO STORAGE HOUSE
- 23 PUMP HOUSE
- 24 SLAT HOUSE
- 25 SOIL PRESSURE BUILDING
- 26 HORTICULTURAL GREENHOUSE
- 27 STORAGE SHED
- 28 STORAGE SHED
- 29 LENGTH-OF-DAY DARK HOUSE
- 30 HORTICULTURAL GREENHOUSE
- 31 TOMATO SEED LABORATORY; BULB HOUSE;
- 32 GARAGE MUSHROOM CELLAR
- 33 GARAGE
- 34 STORAGE HOUSE
- 35 STORAGE HOUSE
- 36 STABLE FOREMAN'S GARAGE
- 37 LENGTH-OF-DAY DARK HOUSE
- 38 LENGTH-OF-DAY DARK HOUSE
- 39 TEMPERATURE CONTROL HOUSE (TOBACCO INVESTIGATIONS)
- 40 IMPLEMENT SHEDS
- 41 FERTILIZER MIXING AND STORAGE LABORATORY
- 42 PATHOLOGICAL GREENHOUSE (CEREAL CROPS)
- 43 SUGAR-PLANT GREENHOUSE
- 44 STORAGE SHEDS
- 45 SUBGRADE LABORATORY (PUBLIC ROADS)
- 46 PUMP HOUSE
- 47 WATER TANK AND TOWER
- 48 CENTRAL HEATING PLANT
- 49 BULB IRRIGATION PUMP HOUSE
- 50 TOOL SHED
- 51 DUST EXPLOSION LABORATORY
- 52 DRAINAGE PUMP HOUSE
- 53 SUGAR-PLANT GREENHOUSE
- 54 STORAGE SHED
- 55 CONCRETE LABORATORY
- 56 BITUMINOUS LABORATORY
- 57 IMPLEMENT SHEDS
- 58 CEREAL PATHOLOGY LABORATORY
- 59 GASOLINE FILLING STATION
- 60 LIGHT CABINET (U.S. PUBLIC HEALTH SERVICE)
- 61 CORN GREENHOUSE AND HEAD-HOUSE
- 62 CHEMICAL FIRE-ENGINE HOUSE
- 63 TURF GARDEN GREENS HOUSE
- 64 SOIL FERTILITY LABORATORY
- 65 GARAGE
- 66 FORAGE CROPS GREENHOUSE AND HEAD-HOUSE
- 67 STORAGE SHED
- 68 CONCRETE SAW-HOUSE
- 69 Sugar Plants
- 70 Horticulture Greenhouse #3 VFB
- 71 " " " " " "

ARLINGTON EXPERIMENT FARM  
BUILDINGS

- 69 Cement Storage Shed (temp)
- 70 Carpenter Shop "
- 71 Machine Shop "
- 72 Farm Building (Shops)  
Replacement #4 destroyed  
by fire
- 73 Soil Shed
- 74 Turf Garden Soil Shed
- 75 Corn Greenhouse #2
- 76 Horticulture Greenhouse  
and Headhouse #3 V.R.B.
- 77 Sugar Cane Greenhouse and  
Headhouse #3
- 78 Bulb Storage & Nursery House
- 79 Horticulture Greenhouse and  
Headhouse #4 P.W.
- 80 Aviation Engine Test Lab.
- 81 Storage Building  
Bureau of Standards
- 82 Tobacco Headhouse
- 83 Drug Lab. and Farm Stables  
Replacement #9 destroyed  
by fire
- 84 Cereals - Forage Crops  
Threshing Shed
- 85 Horticulture Greenhouse and  
Headhouse #5 Pathology  
- Proposed -

12/16/30

